

REMARKS

Because the submission with the RCE filed 4 April 06 has not as yet been submitted to the Examiner, Applicant respectfully requests that the following remarks supersede the "REMARKS" section submitted on that earlier date.

Amendments to the Claims

Applicant has added or revised claims to define the invention more particularly and distinctly so as to overcome the technical rejections and define the invention patentably over the prior art.

Discussion of the Previous Office Action

Additionally, Applicant believes there is patentable merit in some claims rejected in the prior Office Action, and responds as follows:

The Claims Rejection Under 35 U.S.C. 102(e)

The O.A. rejected Claims 1 and 6 as being anticipated by Alexandrov, Patent No. 6,809,483. Applicant has merged claim 6 into Claim 1, added a limitation, and requests reconsideration of this rejection for the following reasons:

The O.A. cited Alexandrov Column 1, lines 8-11, and Column 3, lines 32-59 as implying the basis of Alexandrov's arc detection method is high frequency noise detection. However, Alexandrov also cites that fluorescent lamps in related art are driven by "high frequency" (Col. 1, lines 16-18), implying that his definition of "high frequency" is a characteristic of normal operation.

Applicant notes that in Col 3, lines 5-8, Alexandrov's further use of the phrase "low frequency amplitude modulation of the ballast output voltage" implies that detection of a modulating frequency lower than the fundamental is that patent's principle for arc detection. This view is supported by Alexandrov's further statements: "When arcing occurs and a low frequency rectification begins in the arc..." (Col. 4, lines 6-7), and "As

an example, in the case of ... lamp having carrier frequency of about 250 kHz, modulation frequency in the arcing connector is in the range of about 8-10 kHz.” (Col. 4 lines 12-15.)

In contrast, Applicant uses frequency content above the fundamental frequency to initiate ballast shutdown. Therefore Alexandrov anticipates neither of the previous Claims 1 or 6; nor as combined in the instant Claim 1. A further advantage of Applicant’s circuit is the ability to detect load open or short conditions, not present in the Alexandrov disclosure, and unobvious therefrom.

A Section 102 rejection was made of previous Claim 6 in reference to the unclaimed property of Alexandrov’s sensing circuit to be inactive immediately following circuit energization. Applicant maintains that Applicant’s extra capacitor C9 to temporarily disable the sensing circuit is not anticipated or obvious from prior art and provides an advantage not found in Alexandrov. Applicant observes that startup sense disable feature in Alexandrov is through passive components C27 and C29, which are part of his load waveform lowpass filter circuit. In contrast, Applicant’s separately added C9 introduces a time constant separate from that inherent in Alexandrov’s load frequency filtering.

As a corollary, changing C27 and C29 in Alexandrov’s circuit would change the filter time constants, and therefore his initial desense time. By Applicant’s use of C9, the initial desense time is essentially decoupled from the filter time constants, thus providing an additional advantage.

The Claims Rejection Under 35 U.S.C. 103

Rejection of previous Claim 4. (OA p. 6) Examiner cites Alexandrov in view of Jayaraman (5,650,694) as making obvious the use of an isolation transformer as the sense element. With modifications, this is now part of new Claim 28. Applicant’s design differs by placing the isolation transformer secondary in series with the switching

element output. Applicant's design achieves additional results not mentioned in either prior art reference whether singly or in combination:

For one, the ballast will shut down in case of lamp open circuit. This is because absence of AC current through the sense transformer primary, with a load open condition, will in turn reduce voltage at node 'X' causing shutdown.

Secondly, because a minimum amount of harmonic frequency energy is required to maintain ballast operation, the occurrence of load short circuit also shuts down the ballast, because the harmonics due to lamp presence are not detected.

These unique features are not obvious from combining the Alexandrov and Jayaraman references. Additionally, Applicant uses the inherent MOSFET body diode in a unique way, which is reflected in new claim 25.

Claim 5. (OA p. 5) Examiner alleges that Applicant's use of an optical isolator in an alternative embodiment is obvious from Alexandrov in view of Sun, (5,574,335). Applicant notes the Sun shutdown circuit (5,574,335 Fig. 2) apparently activates the optoisolator when C14 charges above the threshold voltage of switch element D2, in turn activating triac TR1 to shut down the ballast. Therefore, Sun uses the optoisolator as an on-off element to relay a signal from the sense element, which is unlike Applicant's proposed use.

In Applicant's alternative concept, the optical isolator input LED may be placed effectively in parallel with the lamp to sense lamp drive frequency (Figure 7). The optoisolator is therefore an input stage to the depicted high pass filter and amplifier along with the following Schmitt trigger, as output stage. These latter elements condition the raw lamp sense signal from the optoisolator and "make the decision" to shut down the ballast.

In other words, Sun uses the optoisolator in a post-processing mode to shut down the ballast after the "decision" was made to shut down, by his detection circuit comprising C14, D2, etc.

In contrast, Applicant would apply an optoisolator in a pre-processing mode to gather raw sense information that is subsequently "decided upon" by the signal conditioner and threshold detector. Therefore, Applicant submits his use of the optoisolator is not obvious in view of Sun.

Claim 10. Examiner's rejection of claims say that the "PLL-LPF arrangement as taught by Szepesi (4,535,399)... would allow a generation of driving signal that is phase adjusted for optimum switching performance, thereby adjusting any output frequency to the load" (OA p. 11, first paragraph).

In contrast, Applicant would apply the PLL to detect the oscillator circuit frequency, rather than to modify it. In Applicant's proposed technique, changes in the PLL control loop voltage are monitored to detect frequency excursions above the normal operation range, with following stage circuitry creating a shut down signal.

In summary, Szepesi uses a PLL to control inverter frequency, Applicant would use one to sense the frequency.

Applicant now also makes note of US Patent 6,008,592 (Ribarich). This reference apparently uses a PLL to monitor the ballast operating frequency, and shut down the ballast when the frequency exceeds a predetermined threshold.

Applicant's use of the PLL is different from Ribarich in that Applicant uses a DC blocking capacitor as shown in Fig. 4 to in effect monitor only changes in operating frequency.

Applicant also submits additional claims 25-32 to further distinguish his invention over the prior art. Support for these claims is provided in the originally submitted specification and drawings.

To expedite prosecution, questions may be directed to the undersigned agent by telephone, facsimile, or email.

Respectfully submitted,

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